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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/105,739	06/26/1998	GARY B. BRONNER	BU9-97-149	5946

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EXAMINER

RAO, SHRINIVAS H

ART UNIT PAPER NUMBER

2814

DATE MAILED: 03/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/105,739

Applicant(s)

BRONNER ET AL.

Examiner

Steven H. Rao

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Response to Amendment

Applicants' amendment filed December 23, 2002 has been entered on January 16, 2003.

Therefore claims 1 and 17 (the only independent claims) as recited in the amendment and claims 2 to 16 and 18-29 as originally filed are currently pending in the application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Esch et al. (U.S. Patent. No. 4,240, 845 herein after Esch) previously applied in view of AAPR (Applicants' admitted prior art as shown in at least figure 22 and specification pages 3 – 4., herein after AAPR) newly applied.

With respect to claim 1 Esch describes a method for forming interconnect between a storage capacitor (Fig. 3F # 45, col. 15, line 44-45) and transfer device (metal line)(fig. 3M, metal word line) in a memory cell including:

Forming a capacitor having a lip extending over the top (fig. 3 F-I, # 49, col. 15 line 50-52) and diffusing dopant from the lip into the top surface of the substrate forming a surface strap (Fig. 3G, col. 15 lines 53-64).

Esch does not specifically mention the surface strap providing a connection between the capacitor and the transfer device.

However AAPR fig.22 shows surface strap 11 connecting the capacitor24 and the transfer device 14 to form straps that are self aligned with capacitor and the transfer device and to form memory cells with higher densities.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include AAPR's strap that connects the capacitor and the transfer device to form straps that are self aligned with capacitor and the transfer device and to form memory cells with higher densities.

B. Claims 2 -29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esch as applied to claim 1 above, and further in view of Saenger et al. (U.S. Patent No. 5,633,781, herein after Saenger cited by the applicants in their IDS) as previously applied and further in view of AAPR (Applicants' admitted prior art as shown in at least figure 22 and specification pages 3 -4., herein after AAPR) newly applied.

With respect to claims 2-3 Esch describes a method for forming interconnect between a storage capacitor (Fig. 3F # 45, col. 15, line 44-45) and transfer device (metal line)(fig. 3M, metal word line) in a memory cell including:

Forming a first layer (fig. 3 A # 41, col. 15 line 14) on the substrate (fig. 3A # 39, col. 15 line 13-14), etching a capacitor opening (fig. 3 E # 47, col. 15 lines 39-42),

Esch does not specifically disclose the formation of sidewall spacers.

However, Saenger discloses a sidewall spacer in Fig. 1 # 18, col. 3 line 49-50 to isolate the electrode with a high dielectric constant material.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Saenger's sidewall spacers in Esch's process to isolate the electrode with a high dielectric constant material. (Saenger col. 4 line 55-65).

Etching a trench in the substrate (Esch Fig. 3 C # 44, 45, col. 15 lines 28), removing sidewall spacer (Esch fig. 3 H) filling the trench with polysilicon capacitor fill material (Esch figs. 3 E- M, col. 15 line 42- 60).

With respect to claims 4 - 5 Esch describes a method for forming interconnect between a storage capacitor (Fig. 3F # 45, col. 15, line 44-45) and transfer device (metal line)(fig. 3M, metal word line) in a memory cell including:

Recessing the capacitor fill material (Esch fig. 3 F) and filling with dielectric material (Esch fig. 3 G # 50,col. 15 line 63) and wherein the diffusing is done by annealing (Esch col. 16 line 30).

With respect to claims 6-9 Esch describes a method for forming interconnect between a storage capacitor (Esch Fig. 3F # 45, col. 15, line 44-45) and transfer device (metal line)(fig. 3M, metal word line) in a memory cell including: a gate dielectric, a polysilicon gate conductor and a silicon nitride or silicon dioxide insulator (Esch Fig. 3 J, col. 16 line 26- 30).

With respect to claims 10-11 Esch describes a method for forming interconnect between a storage capacitor (Esch Fig. 3F # 45, col. 15, line 44-45) and transfer device (metal line)(fig. 3M, metal word line) in a memory cell including: claim 10 repeats the steps of claim 1-9 and further adds forming a shallow trench isolation step (well known). Claim 11 adds a patterning step (Saenger col.4 line 1).

With respect to claims 12-15 Esch describes a method for forming interconnect between a storage capacitor (Fig. 3F # 45, col. 15, line 44-45) and transfer device (metal line)(fig. 3M, metal word line) in a memory cell including:

Claims 12 and 15 repeat all the steps of claims 1-11 and add the step of source/drain implants (Esch col. 16 lines 29-35), patterning the word line by etching (Esch fig. 4 M, col. 16 lines 46-56,) removing a portion of insulator (Esch fig. 3 H),

Claims 16 repeats the steps of claim 6, claim 17 repeats the steps of claim 1 and 11, claims 18-19 repeat the steps of claims 6 and 9. Claim 20 repeats the steps of claim 1.

With respect to claims 21 – 29 Esch describes a method for forming interconnect between a storage capacitor (Esch Fig. 3F # 45, col. 15, line 44-45) and transfer device (metal line)(fig. 3M, metal word line) in a memory cell including:

N + doped poly silicon (well known) claim 22 repeats steps of claim 12, claim 23 repeats steps of claim 14, claim 24 repeats steps of claims 12 and 15, claim 25 repeats steps of claim 23, claim 26 repeats steps of claim 14, claim 27 repeats steps of claim 13 and 15, claim 28 repeats steps of claim 12 and 26, claim 29 repeats steps of claims 12 and 28.

Response to Arguments

Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is 703-306-5945. The examiner can normally be reached on M-F, 8.00 to 5.00.

The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703- 308-0956.

SR
02/18/03

Wael Elh...
SUPERVISOR
TECHNOLOGY CENTER